

Biological Control In Western Colorado



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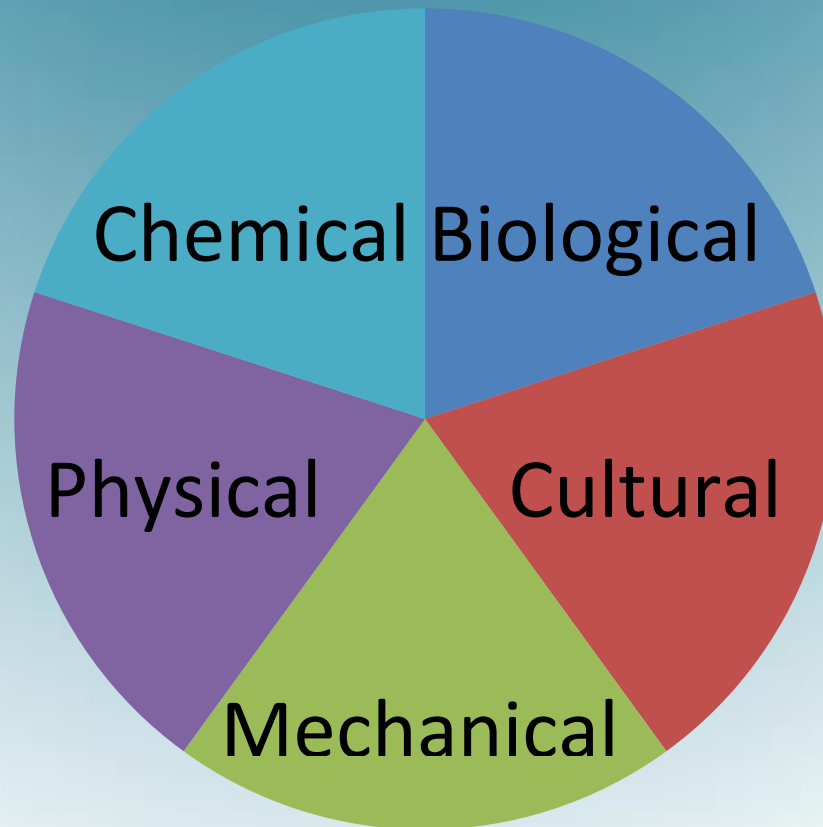


COLORADO
Department of Agriculture
Conservation Services Division

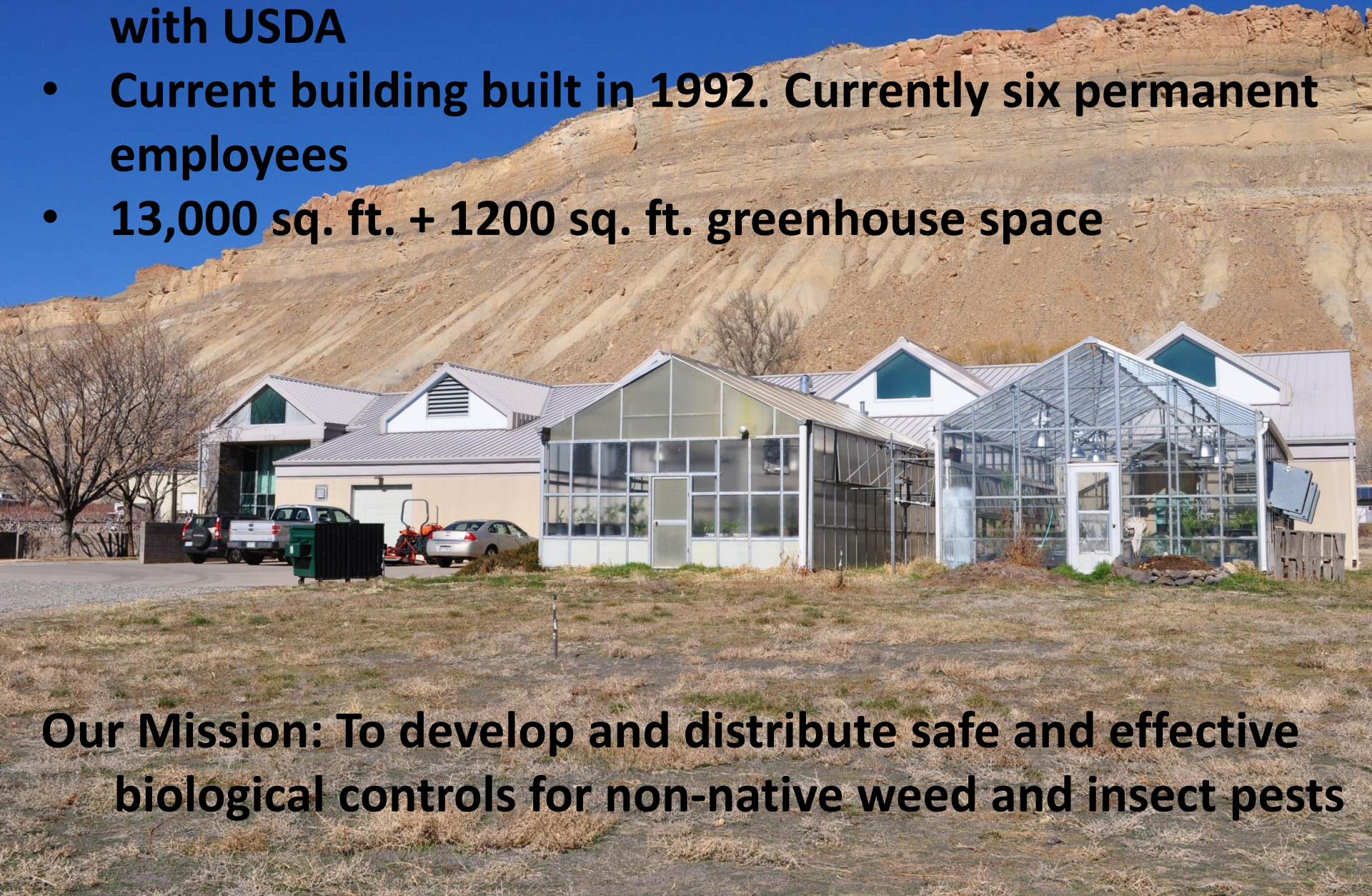
Biological Control

Safe, inexpensive, sustainable, and effective means of reducing pests through the use of natural enemies

Integrated Pest Management



- **Insectary established in 1945, by CDA in coordination with USDA**
- **Current building built in 1992. Currently six permanent employees**
- **13,000 sq. ft. + 1200 sq. ft. greenhouse space**



Our Mission: To develop and distribute safe and effective biological controls for non-native weed and insect pests

The Palisade Insectary in the 1940's



Original Insectary building, Palisade Colorado.

(Photo courtesy of Colorado Department of Agriculture.)

The First Project: Oriental Fruit Moth Biocontrol

- The moth is found in our Upper Grand Valley
- Damages new shoots in spring, fruit in summer
- Overwinters as full-grown larvae in silken cocoon

“Mac”

Macrocentrus ancylivorus

Parasitoid of Oriental Fruit Moth

Insectary releases approx. 1.5 million every year

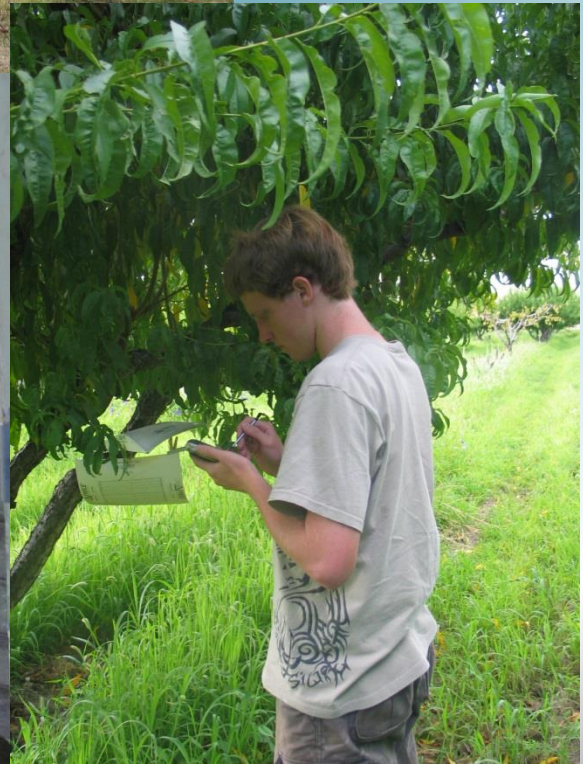




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Russian knapweed Biocontrol Using a Fly

- *Perennial, clonal growth

- *Invades rangeland, cropland, roadsides, riparian, disturbed (arid & irrigated) sites, drought tolerant

- *Toxic to horses



The Russian Knapweed Gall Fly

Jaapiella ivannikovi



*Up to 14 larvae (**maggots**) per gall

*4-5 generations/year

*They attack stem tip,
reducing flower
production









Canada Thistle Biocontrol



Canada Thistle Rust Fungus

Puccinia punctiformis

(F. Strauss) Rohl.

- First plant pathogen suggested as biocontrol (1893)
- Present throughout CT range
- Spreads very slowly on its own
- Host specific (only attacks CT)
- Systemic disease that kills host
- Much cheaper control method





Biocontrol of Musk Thistle

- Biennial Forb that reproduces only by seed



- Invades pasture, rangeland and other disturbed areas throughout U.S.



Musk Thistle Rosette Weevils

- Feeding by the rosette weevil, *Trichosirocalus horridus*, kills the crown tissue of musk thistle rosettes, *Carduus nutans*.
- Black streaks can be seen where the larvae have moved through the rosette.
- Adults are collected and redistributed late June through mid-July.





Biocontrol of Tamarisk

Tamarisk beetles were first released in western CO at Horsethief canyon in 2005

Larvae and adults feed on tamarisk foliage

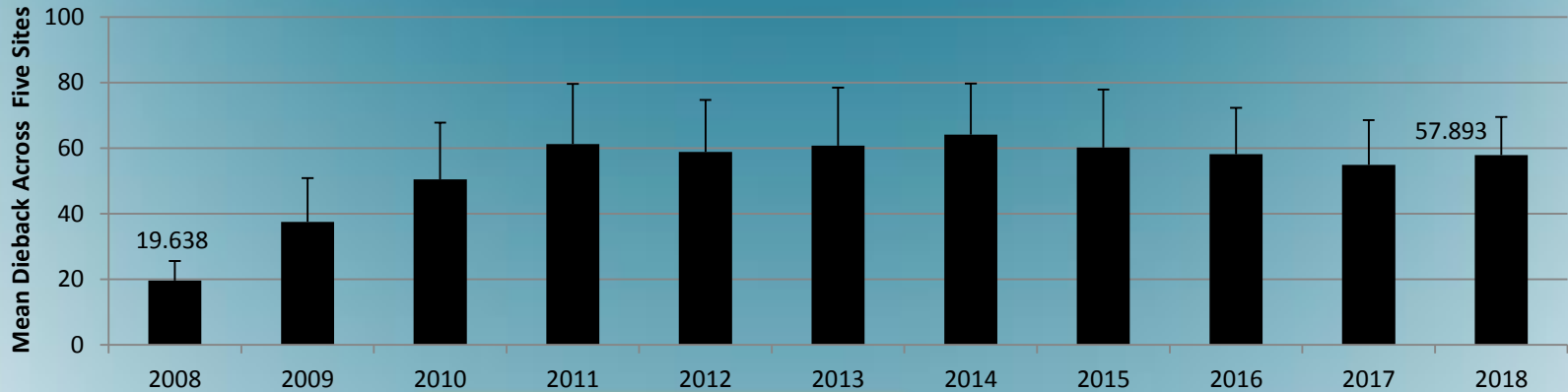
Since this time beetles have established and defoliated massive tamarisk stands throughout CO resulting in mass dieback and tree mortality



Monitoring Results

Beetle Herbivory to Tamarisk in CO has Resulted in...

Mean Dieback at Sites with at Least Three Defoliations 2008-2018



Biocontrol of Field Bindweed

- Perennial vine – Morning glory family
- Extensive creeping roots
- Tillage only increases plant numbers
- Seeds viable for 10+ years
- Problem in dry land ag, rangeland, right-of-ways and pasturelands



The Bindweed Gall Mite - *Aceria malherbae*

- Microscopic tube-shaped mite
- Leaves fold in half and curl, forming a gall. Midrib “bumpy”
- Prevents seed production
Overwinters on roots
- Available Late May - August



Puncturevine Weevils



Seed Weevil - *Microlarinus lareynii*

Feeds & develops within the seed



Stem Weevil – *Microlarinus lypriformis*

Feeds & develops within the stem

Both were introduced into Colorado in 1961

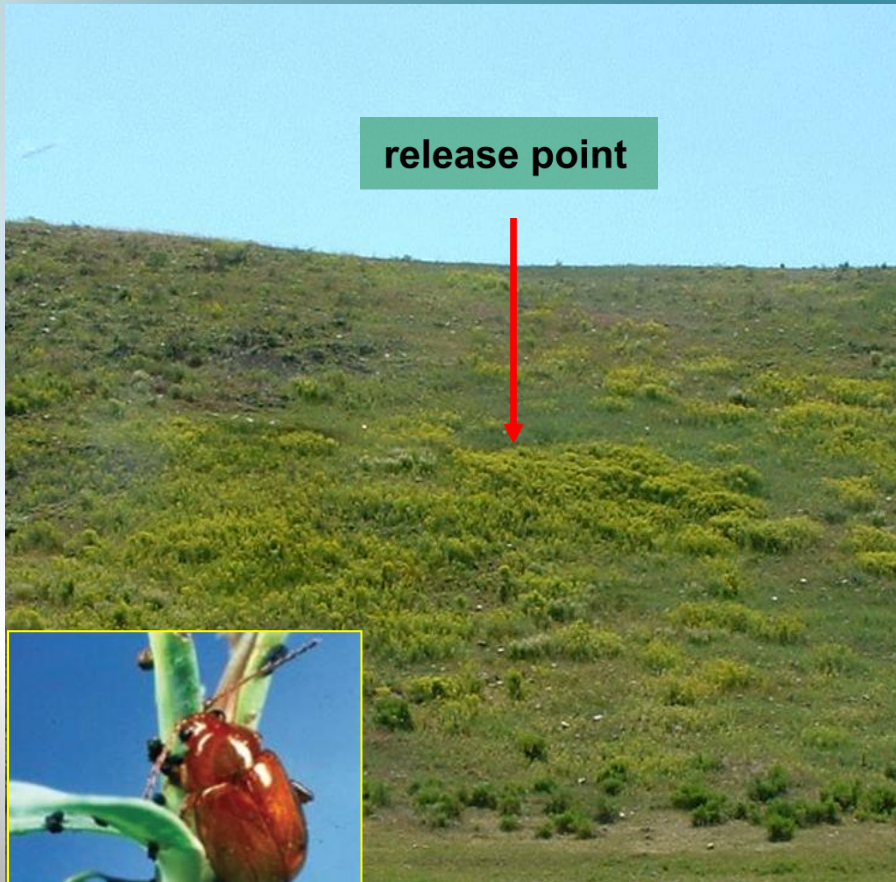
Did not do well due to our cold winters

Cold-hardy strain discovered in E. Colorado in 1978
and redistributed across the state

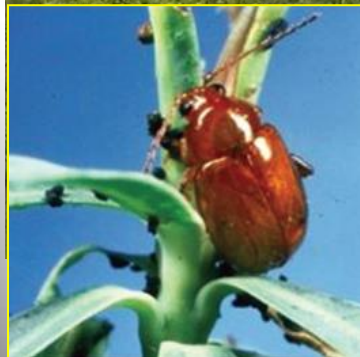
- Can reduce puncturevine population to a manageable level
- Takes several years to exhaust seed bank

Leafy Spurge Biocontrol

Leafy spurge, Rio Blanco County (leafy spurge flea beetles)



release point



2007



2008

Biocontrol for Toadflaxes

Stem Weevils - *Mecinus janthinus*

- Stem boring weevils for dalmation and yellow toadflaxes
- Adults emerge from stems in spring, lays eggs in new stems and overwinter as adults

